

LETTER TO THE EDITOR

ANALOGIES IN MEDICINE: STARRY-SKY APPEARANCE

Belo Horizonte, June 11, 2014

Dear Sir

Burkitt lymphoma is a cancer of the lymphatic system (in particular, B lymphocytes). It was named after Denis Parson Burkitt, a missionary doctor/surgeon and a research scientist, who first described the disease in 1958 while working in Equatorial Africa. In the original report, this type of lymphoma was described in the jaw of young African children. Dennis Burkitt was born in Ireland February 1911 and died March 1993 (Fig.1).

Burkitt lymphoma (BL) is a high-grade malignant lymphoma composed of germinal center B cells which can present in three clinical settings: 1. Endemic; 2. Sporadic; 3. Immunodeficiency-associated⁵. There is an association of BL with EBV (Epstein-Barr virus), with frequencies of approximately 100% for the endemic type, 20%-30% for the sporadic type, and 25-40% for the immunodeficiency-associated type. EBV-positive sporadic BL is associated with low socioeconomic status. However, BL in equatorial areas of Brazil EBV-association rates are higher. Many patients experience a prodromal stage of polyclonal B cell activation caused by bacterial, viral, or parasitic infections (malaria). BL is very aggressive but responds well to high-dose chemotherapy. Most children and young adults can be cured.



Fig. 1 - Dr. Denis Burkitt, a child with Burkitt lymphoma and the “starry-sky pattern”

In BL the histological sections have a unique appearance at low power (Fig. 1). The tumor cells, which are medium sized and round with minimal cytoplasm, are closely apposed to each other, forming a dark blue background (the “sky”). These cells have a very high turnover rate, so the macrophages that happen to be hanging around get stuffed with cellular debris (they are at this point called “tingible body macrophages”), and upon fixation, the cytoplasm falls away, leaving round white spaces filled with debris (the “stars”). This “**starry-sky pattern**” can be seen on bone marrow, lymph node and extranodal masses sections, and it is quite specific for Burkitt lymphoma (Fig. 1-2)²⁻³.

The pattern of growth of BL is usually diffuse. Mitoses are numerous. A prominent starry sky pattern is the rule, although by no means pathognomonic⁵. Lymphoblastic lymphoma, some thymomas, rheumatoid lymphadenopathy and non-neoplastic lymph nodes may show reactive germinal centers with numerous tingible bodies within histiocytes resulting in a prominent starry-sky pattern. We don't know who created the histological comparison with the “starry sky” pattern^{1,3,4}. Perhaps the unknown Author was inspired by the van Gogh's beautiful night paintings.

Vincent Willem van Gogh (Dutch: 30 March 1853 - 29 July 1890) was a post-Impressionist of Dutch origin whose work - notable for its rough beauty, emotional honesty, and bold color - had a far-reaching influence on 20th-century art. After years of painful anxiety and frequent bouts of mental illness, he died aged 37 from a gunshot wound, generally accepted to be self-inflicted (although no gun was ever found). His work was then known to only a handful of people and appreciated by fewer still.



Fig. 2 - Starry Night over the Rhone. Van Gogh. 1888

In a letter written to Émile Bernard in April 1888, Van Gogh expressed his desire to paint the night sky, and questioned whether he could achieve his intention by painting from nature as the Impressionists did.

The imagination is certainly a faculty which we must develop and it alone can bring us to creation of a more exalting and consoling nature... A star-spangled sky, for instance, that's a thing I would like to try to do... But how can I manage unless I make up my mind to work ... from imagination?

In September 1888, before his December breakdown that resulted in his hospitalization in Arles, he painted **Starry Night over the Rhone** (Fig. 2). Working by night under a gas lamp, Van Gogh painted this work directly from nature. "It does me good to do what's difficult", Van Gogh wrote, "That doesn't stop me having a tremendous need for, shall I say the word - for religion - so I go outside at night to paint the stars⁶."

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